

SOIL VEGETATION & HEALTH

M.U. Jayasekara

ABSTRACT

The soil vegetation & health group is presently concerned with studying the corelationship between soil trace elements and endemic disease. .

The philosophy behind this exercise is that, in Sri Lanka most people depend on their immediate environment for a good portion of their food. So, any disparity of trace elements in the soil will be reflected in the plants and Later in Man. The fact that Sri Lanka has 9 of the 10 major soil groups in the world, makes it more important that these studies are conducted in Sri Lanka, so that any excesses or paucities of trace elements found in any group of soil in Sri Lanka may mimic the picture in the same soil group elsewhere in the globe.

Our assault on the problem is three pronged. Studies are directed in elucidating the corelationship between soil iodine and endemic goitre, soil selanium and malignant tumors, commonly reffered to as 'cancer' and soil fluoride and dental disease.

The study plan calls for the collection of 5000 soil samples from specified locations marked in a grid, so that each soil sample represents 5 square miles of surface land.

STUDIES ON ENDEMIC GOITRE

The Sri Lankan figures for the I_2 intake in the water soluble form is in excess of 100-150 μ g/day/adult. which is the WHO standard. Yet the I_2 levels in the areas where goitre is endemic is lower than, those in the rest of the island.

This clearly indicate that Sri Lanka needs its own standards for I₂ intake.

In the laboratory testing of over 400 soil samples in 1987 obtained from areas with a high incidence of goitre and from those with a low incidence, indicated that higher levels of Cobolt and Manganese corelates well with low incidence of goitre. Our studies also showed that Cobolt forms a complex with thiocyanate, thus preventing the body utilising thiocyanate which is a goitrogen.

STUDIES ON "CANCER"

Our studies were confined to an area with a high incidence of gastric cancer as well as a area with no known cases of gastric cancer.

The soil-clay selenate complex was found to be highly stable in Nawalapitiya which has a very high incidence of gastric cancer. This was found to be so due to its peculiar clay mineralogy with a high proportion of gibbsite. Although the soil selenium levels in Nawalapitiya area compares well with areas of no known incidence of gastric cancer, the stable selenate complex seems to deprive the target population of available selenium which has a protective effect on the body against 'cancer'.

Our group has also observed that the high incidence of gastric cancer in Sri Lanka is directly corelated with a higher presence of soluble organic matter (fulvic acid). Although fulvic acid per se is not a carcinogen, it may act as a catalyst in the nitrosamine formation. In the laboratory, it was observed that the catalytic effect is dependent mainly on carboxyl groups in fulvic acid. Our experiments have indicated that selenate can convert the carboxyl groups into Co₂, thus preventing the above catalytic effects. So the presence

of selenium may have a protective effect on 'cancer' induction by nitrosamines.

STUDIES ON DENTAL DISEASE

In 1987, we have directed our efforts on defluoridating the fluoride rich water in Sri Lanka of the two methods studied, one technique is already published while the other will be discussed today by a co-worker. Epidemiological data suggests that the incidence of dental caries is higher in industrial areas in Sri Lanka when compared with rural areas. When the tooth enamel was studied, an inverse relationship was found between the enamel content & the tooth lead content.